



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/086,642	03/04/2002	Kenneth K. Li	2138-241	7005

6449 7590 07/15/2004

ROTHWELL, FIGG, ERNST & MANBECK, P.C.
1425 K STREET, N.W.
SUITE 800
WASHINGTON, DC 20005

EXAMINER

NGUYEN, SANG H

ART UNIT	PAPER NUMBER
----------	--------------

2877

DATE MAILED: 07/15/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/086,642

Applicant(s)

LI, KENNETH K.

Examiner

sang nguyen

Art Unit

2877

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 28 April 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-38 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-4, 14-32, 36 and 37 is/are rejected.
- 7) ☒ Claim(s) 5-13, 33-35 and 38 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 17 May 2002 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 04/04 & 09/02.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

The present Office action is made in response to the amendment/Election Requirement filed on 04/28/04. It is noted that the present application contains claims 1-38 by the Amendment/Election Requirement filed on 04/28/04.

Drawings

Figures 1-13 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). Corrected drawing sheets are required in reply to the Office action to avoid abandonment of the application. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they do not include the following reference character(s) mentioned in the description: In particular, the references "332" and "330" are not shown in figure 14. Corrected drawing sheets are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct

any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Objections

Claims 17-38 are objected to because of the following informalities: In particular, the term "system" of claims 17-38 in line 1 should be changed to -- apparatus--.

Appropriate correction is required.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-2 and 14-16 are rejected under 35 U.S.C. 102(b) as being anticipated by Winston (U.S. Patent No. 4,240,692).

Regarding claim 1; Winston discloses a NA equalizing apparatus for transmitting energy transmission, comprising:

- a transmission element (10 of figure 4 or 17 of figures 6 and 9), the transmission element (10 of figure 9) having an input surface (13 of figure 4);
- the input surface of the transmission element (17 of figure 9) having a first

input dimension (figure 9) and a second dimension (figure 9), the second dimension being substantially orthogonal to the first input dimension (figure 9); and

- wherein the first input dimension is substantially unequal to the second input dimension (figure 9). See figures 1-9.

Regarding claim 2; Winston teaches at figure 9 that the first input dimension is substantially larger than the second input dimension.

Regarding claim 14; Winston discloses the transmission element (10 of figure 1) is comprised of a material selected from the group consisting of glass, acrylic, silicon, plastic, and quartz (col.8 lines 44-55 and col.12 lines 10-30).

Regarding claims 15-16; Winston teaches that the transmission element comprises a hollow tube for transmitting light to the object (figures 6-9), wherein the hollow tube comprises an inner surface coated with a substantially reflective coating (col.1 lines 34-36 and 50-53 and 60-65).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 3-4, 17, 20-32, and 36 are rejected under 35 U.S.C. 103(a) as being unpatentable over Winston (U.S. Patent No. 4,240,692) in view of Ferrante et al (U.S. Patent No. 6,595,673) and Strobl et al (U.S. Patent No. 5,414,600 submitted by Applicant).

Regarding claim 3; Winston discloses the claimed invention except for the first input dimension is substantially smaller than the second input dimension. It would have been obvious to one having ordinary skill in the art at the time the invention was made to include of a NA equalizing apparatus of Winston with the first input dimension is substantially smaller than the second input dimension, since it has held that a mere reversal of the essential working parts of a device involves only routine skill in the art. In re Einstein, 8 USPQ 167.

Regarding claim 4, Winston discloses the claimed invention except for the input surface has a shape selected from the group consisting of an ellipse, a rectangle, an oval, a double circle, a hexagon, and an octagon. However, Ferrante et al teaches that it is known in the art to provide the input surface has a shape selected from the group consisting of an ellipse, a rectangle, an oval, a double circle, a hexagon, and an octagon (figures 8A-8F and 9A-9B). It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify a NA equalizing apparatus of Winston with the input surface has a shape selected from the group consisting of an ellipse, a rectangle, an oval, a double circle, a hexagon, and an octagon as taught by Ferrante et al for the purpose of improving uniformed intensity profile outputs.

Regarding claim 17; Winston discloses all of features of the claimed invention except for a reflector having a first and a second focal point, a source of electromagnetic radiation located proximate to the first focal point to produce rays of radiation that are reflected by the reflector and converge substantially at the second focal point, and the input surface located proximate to the second focal point to collect

the electromagnetic radiation. However, Strobl et al teaches that a reflector (M1 of figures 2A-2B) having a first and a second focal point (F1, T of figures 2A-2B), a source of electromagnetic radiation (5 of figure 2A) located proximate to the first focal point (F1 of figure 2A) to produce rays of radiation that are reflected radiation by the reflector (M1 of figure 2A) and converge substantially at the second focal point (T of figures 2A-2B), and the input surface (T of figure 2A) to collect the electromagnetic radiation (see figures 2A-2B). It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify a NA equalizing apparatus of Winston with a reflector having a first and a second focal point, a source of electromagnetic radiation located proximate to the first focal point to produce rays of radiation that are reflected by the reflector and converge substantially at the second focal point, and the input surface located proximate to the second focal point to collect the electromagnetic radiation as taught by Strobl et al for the purpose of reducing of flux density collectable by a small target such as optical fiber (col.1 lines 42-43).

Regarding claims 20-24; Winston discloses all of features of the claimed invention of claim 17 except for wherein an additional reflector constructed and arranged to reflect at least of portion of the electromagnetic radiation that does not impinge directly on the reflector toward the reflector through the first focal point of the reflector to increase the flux intensity of the converging ray, wherein the additional reflector is a spherical retro-reflector disposed on a side of the radiation source and opposite the reflector. However, Strobl et al teaches that it is known in the art to provide an additional reflector (M2 of figure 7A) constructed and arranged to reflect at least of

portion of the electromagnetic radiation that does not impinge directly on the reflector toward the reflector through the first focal point of the reflector (M1 of figure 7A) to increase the flux intensity of the converging rays, wherein the additional reflector (M2 of figure 7A) is a spherical retro-reflector disposed on a side of the radiation source (5 of figure 7A) and opposite the reflector (M1 of figure 7A). See figures 7A-7B. It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify a NA equalizing apparatus of Winston with an additional reflector, wherein the additional reflector is a spherical retro-reflector disposed on a side of the radiation source and opposite the reflector as taught by Strobl et al for the purpose of reducing of flux density collectable by a small target such as optical fiber (col.1 lines 42-43).

Regarding claims 25-29; Winston discloses all of features of the claimed invention of except for the reflector comprising a first reflector having a first optical axis, the first focal point being a focal point of the first reflector, the first focal point being on the first optical axis and a second reflector having a second optical axis, the second focal point being a focal point of the second reflector and the second optical axis, wherein the second reflector is disposed substantially symmetrically to the first reflector such that first optical axis is collinear with the second optical axis. However, Strobl et al teaches that it is known in the art to provide the reflector comprising a first reflector (M1 of figure 7B) having a first optical axis, the first focal point being a focal point of the first reflector (M1 of figure 7B), the first focal point being on the first optical axis and a second reflector (M2 of figure 7B) having a second optical axis, the second focal point being a focal point of the second reflector (M2 of figure 7B) and the second optical axis,

wherein the second reflector (M2 of figure 7B) is disposed substantially symmetrically to the first reflector (M1 of figure 7B) such that first optical axis is collinear with the second optical axis (figures 7A-7B). It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify a NA equalizing apparatus of Winston with the reflector comprising a first reflector having a first optical axis, the first focal point being a focal point of the first reflector, the first focal point being on the first optical axis and a second reflector having a second optical axis, the second focal point being a focal point of the second reflector and the second optical axis, wherein the second reflector is disposed substantially symmetrically to the first reflector such that first optical axis is collinear with the second optical axis as taught by Strobl et al for the purpose of reducing of flux density collectable by a small target such as optical fiber (col.1 lines 42-43).

Regarding claims 30-32; Winston discloses all of features of the claimed invention of except for the source radiation comprises a light emitting arc lamp, wherein the arc lamp is selected from the group comprising a xenon lamp, a metal halide lamp, an HID lamp, or a mercury lamp. However, Strobl et al teaches that the source radiation (S of figure 4) comprises a light emitting arc lamp, wherein the arc lamp is selected from the group comprising a xenon lamp, a metal halide lamp, an HID lamp, or a mercury lamp (col.5 lines 10-27). It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify a NA equalizing apparatus of Winston with the source radiation comprises a light emitting arc lamp, wherein the arc lamp is selected from the group comprising a xenon lamp, a metal halide lamp, an HID lamp, or

a mercury lamp as taught by Strobl et al for the purpose of achieving optimum performance of radiation system (col.5 lines 26-27).

Regarding claim 36; Winston discloses all of features of the claimed invention of except for further a fiber optic being illuminated by the radiation source for collecting radiation at the transmission element, the fiber optic releasing the collected radiation to provide for illuminating at a desired location. However, Strobl et al teaches that a fiber optic (18 of figure 6B) being illuminated by the radiation source (S of figure 6B) for collecting radiation at the transmission element, the fiber optic releasing the collected radiation to provide for illuminating at a desired location. See figures 6-8. It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify a NA equalizing apparatus of Winston with a fiber optic being illuminated by the radiation source for collecting radiation at the transmission element, the fiber optic releasing the collected radiation to provide for illuminating at a desired location as taught by Strobl et al for the purpose of achieving optimum performance of radiation system (col.5 lines 26-27).

Claims 18-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Winston in view of Strobl et al as applied to claim 17 above, and further in view of Kingston et al (U.S. Patent No. 5,528,714).

Regarding claims 18-19; Winston and Strobl et al discloses all of features of the claimed invention except for the reflector has a coating material for reflecting a pre-specified portion of electromagnetic radiation spectrum. However, Kingston et al teaches that it is known in the art to provide the reflector (32 of figure 8) has a coating

material (col.7 lines 40-46) for reflecting a pre-specified portion of electromagnetic radiation spectrum. It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify a NA equalizing apparatus of Winston with the reflector has a coating material for reflecting a pre-specified portion of electromagnetic radiation spectrum as taught by Kingston et al for the purpose of directing light to focal point coincident with ends of transmission element such as optical fiber.

Claim 37 is rejected under 35 U.S.C. 103(a) as being unpatentable over Winston in view of Strobl et al as applied to claim 17 above, and further in view of Horiuchi et al (JP 01049017).

Regarding claim 37; Winston and Strobl et al discloses all of features of the claimed invention except for a condenser lens disposed proximate to the transmission element, an image projection system disposed proximate to an output side of the condenser lens, and an image being illuminated by radiation collected and condensed at the optical coupling element, the projection system releasing the collected and condensed radiation to display the image. However, Horiuchi et al teaches that it is known in the art to provide a condenser lens (3 of figure 1) disposed proximate to the transmission element (4 of figure 1), an image projection system (6 of figure 1) disposed proximate to an output side of the condenser lens (3 of figure 1), and an image (7 of figure 1) being illuminated by radiation collected and condensed at the optical coupling element, the projection system releasing the collected and condensed radiation to display the image (7 of figure 1). It would have been obvious to one having ordinary skill

in the art at the time the invention was made to modify a NA equalizing apparatus of Winston with a condenser lens disposed proximate to the transmission element, an image projection system disposed proximate to an output side of the condenser lens, and an image being illuminated by radiation collected and condensed at the optical coupling element, the projection system releasing the collected and condensed radiation to display the image as taught by Horiuchi et al for the purpose of improving the utilization efficiency of the luminous flux of the illumination system.

Allowable Subject Matter

Claims 5-13, 33-35, and 38 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The prior art of record, taken alone or in combination, fails discloses or render obvious a NA equalizing apparatus comprising all the specific elements with the specific combination including of the transmission element comprises further: an axis, an output surface, the output surface comprising a first output dimension and a second output dimension, the second output dimension being substantially orthogonal to the first output dimension, the second output dimension substantially parallel to the second input dimension, a first input NA in a plane of the first input dimension and the axis, and a second input NA in a plane of the second input dimension and axis, wherein a first ratio of a first product of the first input dimension and the first input NA to the first output dimension is substantially equal to a second ratio of a second product of the second

input dimension and the second input NA to the second output dimension in set forth limitation of claims 5 and 38 in combination with rest of the limitation of independent claim.

The prior art of record, taken alone or in combination, fails discloses or render obvious a NA equalizing apparatus comprising all the specific elements with the specific combination including of further a waveguide disposed proximate to the transmission element to collect the electromagnetic radiation, wherein the waveguide is selected from the group consisting of: a single core optical fiber, a fiber bundle, a fused fiber bundle, a polygonal rod, a hollow reflective light pipe, and homogenizer in set forth limitation of claim 33 in combination with rest of the limitation of independent claim.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Li (6385371) discloses optical system including coupling for transmission light; Miller et al (5967653) discloses light projector with parabolic transmission; Nagasaki et al (5764845) discloses light guide device; Dewier et al (5146248) discloses light valve projection system; Clarke (4915479) discloses liquid crystal display illumination system; Houghton et al (4441783) vessel navigation lights; or Winston (3923381) discloses radiant energy collection.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Examiner Sang Nguyen whose telephone number (571)-272-2425. The Examiner can normally be reached on Monday through Friday From 9:30 AM to 6:30 PM.

Art Unit: 2877

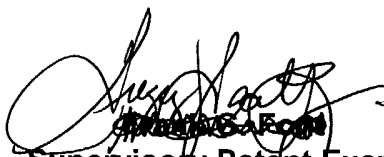
If attempts to reach the Examiner by telephone are unsuccessful, the Examiner's Supervisor, Mr. Frank Font, can be reached on (571) 272-2415. The fax number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

SN

Nguyen/sn

July 07, 2004


Supervisory Patent Examiner
Art Unit 2877
Technology Center 2800